A More Efficient Data Center With Viridity EnergyCenter Software

A Viridity White Paper

August 2010

With Viridity Software organizations are immediately discovering

20–40 percent

improvements in data center energy efficiency.

Executive summary

Power, cooling, and energy efficiency are top challenges in the data center. According to IDC, running out of power and the rising cost of energy are primary drivers behind the need to measure hardware power consumption. Yet, less than half of all enterprises measure their power usage[1]. Why is this?

It's because significant obstacles stand in the way of measuring power usage and energy efficiency in the data center. A recent Green Grid survey showed that 70% of the IT professionals who are not currently measuring energy efficiency said that the reason they aren't measuring it because they do not have the metering equipment needed nor the budget for such equipment[2]. The same survey cited the following as **major obstacles and reasons for not measuring** energy efficiency:

- **TOO DIFFICULT** — complexity of purchasing, deploying, and maintaining metering equipment
- **TOO EXPENSIVE** — not a budgeted item because the solution would require a costly and extensive consulting engagement and additional hardware investment
- **TOO COMPLICATED** — difficult to find a single solution to measure and monitor the diversity of IT equipment within a heterogeneous data center

> *"Driven by industry trends, including virtualization and the shift to high-density environments, the number and density of servers in the data center have increased to the point where energy consumption, and not available floor space, has become the primary factor limiting IT capacity."*
>
> *– Jed Scamarella, IDC Research*

The obstacles for not measuring are real, but not having information about power consumption often leads to major operational and strategic issues such as:

- **RISK OF OUTAGES** — brownouts occur when power distribution units (PDUs) or uninterruptible power supplies (UPS) are over-taxed. The initial power issue often starts with a device or PDU and extends to the rack and row, causing a "cascading" outage.
- **DATA CENTER EXPANSION** — facing a limit on available power, enterprises are forced to expand their IT supply to additional data centers.
- **IMPACTING BUSINESS** — slowed data center expansion often directly impacts revenue-producing functions.

Enter Viridity Software

Viridity Software, from its inception in 2007, recognized the magnitude of the energy issue in the data center and the complexity in obtaining vital energy

1 "Data Center Management: How Rising Costs, High Density, and Virtualization Are Making Energy Management a Requirement for IT Availability," April 2010, IDC Research.

2 "Energy Measurement Survey Results Analysis," November 2009, The Green Grid.

"Viridity Energy Center is the only Data Center Energy Management solution that provides detailed understanding of power consumption within hours of beginning deployment."

– Andy Lawrence, 451 Group

consumption information. Viridity understands that every enterprise depends on the data center for all aspects of the business. In order to meet growing demands, today's data centers are requiring more power, cooling, and floor space. To manage the data center efficiently, operators need insight into power consumption and utilization for all of the equipment in the data center that they haven't had — until now.

Viridity EnergyCenter provides unique value in several ways:

1. Connects **equipment utilization** and business value **to power consumption.** This allows operators to **discover** underutilized or inefficient equipment, **optimize efficiency** by showing stranded capacity and **reduce the risk** of data center brownouts.
2. **Deploys in minutes, not weeks.** With Viridity's software-only approach, no additional hardware or agents are required so deployment is quick.
3. **Achieves "time to value/time to results" in hours, not months**. Within a few hours of starting deployment, actionable information is made available.

This white paper explains how to begin energy optimization and energy resource management with Viridity EnergyCenter software. It shows that with Viridity EnergyCenter, data center managers get a complete understanding of how both physical and virtualized IT equipment is consuming power. And, it will explain in detail about how quickly customers start reducing data center costs.

Viridity EnergyCenter Software: The Energy Resource Management Solution

The Viridity EnergyCenter software modules

Viridity EnergyCenter is a quick to deploy, non-invasive, software-only solution for data center energy management and optimization. EnergyCenter provides actionable information on power consumption and IT equipment utilization enabling data center operators to:

- **CUT POWER COSTS** by identifying and consolidating, refreshing or retiring underutilized equipment.

- **EXTEND THE LIFE OF EXISTING DATA CENTERS** by locating stranded space and energy capacity or rationalize and optimize for data center expansion.
- **INCREASE UPTIME** by proactively avoiding outages through better provisioning and rightsizing data center infrastructure.

Getting Started: Baseline the Environment

Viridity EnergyCenter installs within seven minutes and immediately starts to discover and inventory the networked assets in the data center quickly establishing a baseline of the environment. The initial discovery culls information from networked IT equipment using standard protocols — SNMP, WMI, VMware's V-Sphere protocol, and SSH; eliminating the need for hardware or agents. It identifies the specific configuration down to the subcomponent — processor type and stepping, memory, disks, and other relevant configuration information.

THE INVENTORY MODULE auto-discovers IT assets down to the sub-component level including servers, PDUs, and BCMs. System types can be filtered by data center rack, row, or IP address range providing intelligent on-going asset and facility management.

THE SERVER UTILIZATION MODULE dynamically monitors power consumption (in orange on the chart) and utilization (in green on the chart) across the data center down to the specific device. Because it collects data over time, it identifies trends that a snapshot of data could miss. The software filters down to the individual server level (identified along the left column) to determine how effectively each one is performing.

THE TOP POWER CONSUMER MODULE dynamically tracks the top power consuming equipment and prioritizes them. This identifies the best performing servers based on power (in orange on the chart) consumed versus equipment utilization (in green on the chart.) When you compare power consumed to utilization, you often spot opportunities for greater efficiency.

Eliminate Unproductive Assets

Within a few hours of using Viridity EnergyCenter, data center managers find immediate value because they start identifying and prioritizing unproductive assets that are candidates for consolidation, virtualization, or removal.

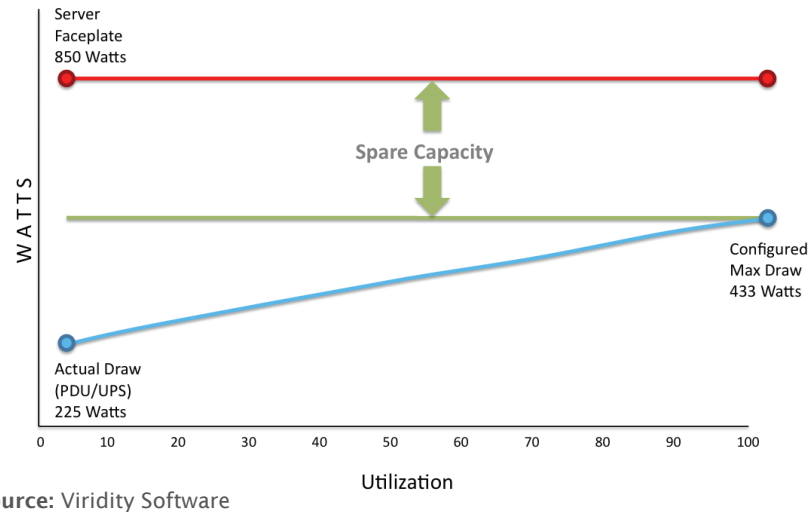
This is typical. In fact, the Uptime Institute states that "as many as 30 percent or more of the servers on the data center floor are not performing useful business work." Potentially useful systems remain unproductive or under-employed for many reasons:

- **USING THE WRONG TOOL FOR THE JOB** — many organizations track data center assets using a spreadsheet or a CAD program that doesn't automatically update as equipment is moved in, out, and around the data center.
- **UNPREDICTABLE USAGE PROFILES** — organizations are unable to predict application-usage profiles which requires systems to run that are of little use.
- **ORPHANED OR "GHOST" SERVERS** — as new applications replace old ones, no one turns off the old server running the old applications.
- **NO CONCEPT OF POWER CONSUMPTION IMPACT** — specific departments have no idea how the applications they run impact the data center environment.

Improve Data Center Efficiency

Data centers have traditionally based energy resource planning on fundamentally flawed power calculations—typically vendor faceplate power specifications, the de-rating of these specifications, or no measurement at all. All of these methods lead to a grossly inaccurate, often inflated view of energy needed which results in margins that create unknown idle capacity.

Spare Capacity



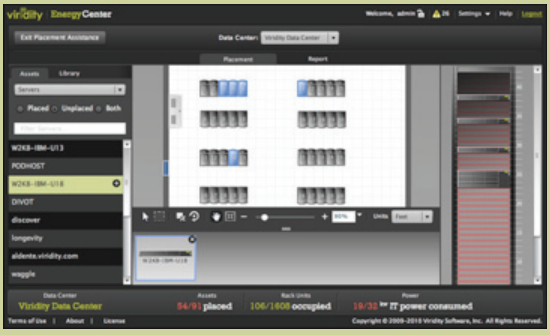
Source: Viridity Software

This chart illustrates how when de-rating is used to estimate the amount of power required for a particular server, power can be overestimated (in red on the chart.) Because Viridity EnergyCenter software takes into account the dynamic nature of the data center, it is able to provide an accurate, detailed energy consumption profile for each system down to its components based on actual utilization and consumption versus de-rated estimates.

THE POWER DISTRIBUTION MODULE tracks power distribution from branch circuit monitors and power distribution units. It compares the information collected to the power consumed by the data center assets. Using this, a Viridity customer who thought that their data center was almost out of power found an additional 20 to 40 percent capacity.

THE RACK POWER MODULE shows the sum of actual power usage by all of the assets in the rack, the sum of power if all of the assets in the rack were 100% utilized, and the amount of power provisioned to the rack. The display can be changed to show the average power consumption by each asset which helps to determine the most efficient placement within the rack.

Viridity EnergyCenter provides information for planning tech refreshes. This is useful because it offers an immediate return on investment (ROI). Intel Corporation is a great example of how a major tech refresh led to lower power consumption. In their 2009 annual report, Intel stated “We estimate that the conversion to the energy-efficient Intel Core micro-architecture saved up to 26 terawatt-hours of electricity between 2006 and 2009, compared to the technology it replaced.”



THE PLACEMENT ASSISTANCE MODULE in EnergyCenter offers an easy-to-use, graphical view of the data center complete with utilization data and automatic updates to server rack inventories. It helps determine the optimal placement for hardware based on rack space, rack power capacity, and server dimension information.

Achieving Optimal Operating Efficiency

As the increased power usage has caused operation expenses to escalate, it has impacted the data center's ability to meet business demands. While working to support business needs without disrupting service, IT managers are looking to run their data centers more efficiently. Until now, it's been difficult to gather information on how much power the data center was consuming and how much the equipment was being utilized. With Viridity EnergyCenter, operators are managing their energy resources — simply, quickly, and affordably — with astonishing results.

About Viridity Software

Viridity Software is the leader in energy resource management (ERM) solutions. Its software-only, sensor-less approach offers customers a cross-functional methodology for understanding the connection between physical infrastructure, IT equipment, and applications. Once these connections are fully understood, actionable information is provided so that customers can run more energy efficient data centers.

Viridity Software
Phone: 877.837.4357
web: *www.viridity.com*
E-mail: *info@viridity.com*